MODELS OF DISTANCE HIGHER EDUCATION: FULLY AUTOMATED OR PARTIALLY HUMAN?

By Peter Serdiukov

The explosion of information technologies in the mid 1990s and the ensuing fast transformation of higher education from traditional, campus-based instruction to automated, web-based, distance learning raises a multitude of difficult issues, among them:

- What kind of schools will our children attend in just a few years?
- How will they learn?
- Will they experience the human touch that is still so dear to our generation?

This article addresses these issues. My vision of them may be problematic, but isn't so our future?

"New educational systems will be created by technology-based teaching. They will eliminate geographical and jurisdictional boundaries, integrate academic and real-world concerns more closely, and give students wider and more affordable choices" (Sir Daniel, 1996).
Technology-Based versus Technology-Supported

As we move into the 21st century, educators try to understand what is in store in our area for all of us—students, teachers and society as a whole. The last quarter of the 20th century has been filled with many turbulent events that deeply influenced our views on teaching, learning and education. There is little doubt, though, that due to major advances in information technology, education will certainly become more technology-based. What will new schools of higher education be like? To what extent will education be computerized or automated? We may only guess, but we can certainly notice the trends today. The purpose of this paper will be threefold: 1) to consider the models of contemporary universities offering distance programs, 2) to analyze how technology changes the model of learning, and 3) to explore how the human dimension will change in the technology-based educational environment.

One of the indicators of the changes in a field of human knowledge or activity is its terminology, the analysis of which allows us to detect changes and perceive trends appearing in the field. Thus, along with the all-evident boom in the development of educational computer courseware and online learning, our own investigation of educational technology (ET) and its terminology showed, among other things, a distinct shift in redefining education in the last five years. We could observe this phenomenon by analyzing the frequency of attributes used to characterize education in the works on ET published in the last five years. For example, just a few years ago when we spoke about computer-involved education, instruction, teaching, or learning, we used the attributes "computer-aided/assisted/supported", e.g., computer-assisted learning (CAL). Today, we are more likely to say "Computer-based or Web-based" education/instruction/teaching/learning, e.g., computer-based learning (CBL), or web-based instruction (WBI) (Serdiukov 1999, 2000). This shift reflects a change in our perception of the current phase in the development of education—we no longer assign a supportive role to technology. On the contrary, technology has become an integral part of education and has begun to shape it and help give birth to new forms of education that are completely based on technology: distance education (DE) or distance learning (DL), with their modifications such as teleteaching, webtraining and others.

Models of New Schools of Higher Learning

These developments lead to the emergence of schools of a new type in which technology is the foundation of instruction: the United Kingdom Open University (UKOU), California Virtual University (CVU), Western Governors University (WGU), China TV University System (CTVU) and so forth. Existing correspondence schools—like the University of Phoenix—have begun using technology as a delivery media on a large scale. We can also observe a rapid reorientation of traditional schools: according to statistics (Distance Education In Higher Education Institutions, 1997), about 70% of the U.S. universities and colleges began offering distance courses in the last four to five years.
Modern ET based on computer and telecommunication technologies—using a broader and more inclusive definition, "knowledge media" (Eisenstadt 1995)—made possible an amazing integration of global resources. Besides amassing huge databases that are available to anybody anywhere in the world, the World Wide Web (WWW or Web) allows us to join educational forces. Now, schools can pool their resources or develop new and integrated structures. We are witnessing the emergence of new educational configurations that intend to transform the market for higher education, thus giving people better access to instruction and training, greater choice for study and professional development and more flexibility of learning. Let us discuss these new structures.

We can single out two major trends in contemporary higher education. The first is the accumulation of resources under the roof of a single university with the purpose of expanding the school's services. The second is the integration of the resources and services of several schools in order to improve marketing and go beyond local geographical boundaries. Thus, students can be reached regionally, nationally and even globally.

Accordingly, we can now identify two models of contemporary universities that offer distance education: an expansion model (EM) (or single-school model), and an integration model (IM) (or multi-school model). Both differ from the conventional campus model (CM). The second model has two varieties: informal integration model (IIM), or informational model—for it is based on informational cooperation—and formal integration model (FIM), or systems model. Integration based on the IIM can be in the shape of an association or a consortium.

The first structure of this new type was The UKOU, established in 1969 and built on the principles of the expansion model. It is a single institution that develops and offers its own educational resources and services. The UKOU has grown intensively during these 30 years and, today, it grants degrees to more than 200,000 students from 17 countries annually.

The next development, CVU, does not grant degrees or certificates, but helps to locate information about courses and certificate or degree programs offered at a distance by California universities and colleges. CVU represents the IM of the first type, which has a simple structure based on cooperation between participating California universities and colleges. It can also be termed a local "Educational Information Network."

The IM of the second type, FIM, is represented by the WGU initially created to combine the educational resources of 13 U.S. Western States (presently it incorporates schools from 23 states) and broker them through one structure. This serves to improve the marketing of educational services of regional universities and take them beyond their local geographic limits. It is a step up from the CVU IM. WGU is a complete system: it offers both single courses and full degree programs. We also call the model of this type a “funnel model:” it collects educational resources of the participating providers at the wide end and produces an increased market effort at the narrow end. Thus, it is designed to
reach and serve a wider population of students in the Western U.S. region more efficiently.

WGU is a new marketing and delivery structure in higher education: it looks more like a business venture than an educational one. It can widen access of students to educational services in the Western States and, maybe, beyond. It can also improve the reach of the universities to the students as customers. It may eventually allow the WGU to compete more successfully for new students both region and nationwide.

The WGU model is attractive from both economical and managerial points of view. It may some day eliminate numerous small universities and colleges that provide similar education and replace them with one huge but cost-effective system. However, it could face numerous problems—the participating schools' unwillingness to disintegrate and their respective state governments' support in this issue, for example. Still the WGU model has the potential to rise to the higher education challenges of the 21st century unless the university, itself, is not overwhelmed with economic, political, logistical and managerial problems. At the present, it falls short of the definition of a mega-university that has to satisfy three criteria: "distance teaching, higher education, and size." Specifically, the size criterion requires a mega-university to have more than 100,000 active students in degree-level courses (Daniel 1996, p. 29).

**Cycle Theory Effect on Distance Education**

Analysis of the tendencies and organizational structures in contemporary higher education allows us to identify certain cycles in the development of new schools and, on the basis of the "cycles" theory, predict the design of the future configurations.

Friedrich Engels, in his “Dialectics of Nature” (1974), elaborated the theory of cycles in the life of the society. He asserted that history develops in cycles, each time rising to a different level. Meditating over the economic issues of the 19th century, a French doctor named Clement Juglar regarded business cycles as the interaction between external facts and internal workings (Cipolletta 1994). In his book, "Destination Z: The History of the Future," Baldock also expresses his view that life goes in cycles. As an example, he uses the current trend of "home working," using electronic links between customers and suppliers that repeat the "home-working of the pre-industrial age" (Baldock, 1999, p. 31). Does Distance Learning remind us of mentoring and tutoring of the old days? Education and business are the forms of human activity incorporated in the society. While education is becoming more industrialized and commercialized, we can extrapolate the laws governing the society and business on education as there undoubtedly are similarities in their development.

Education is a complete, dynamic system. It develops and transforms from one condition to another, in the process of its function and under the influence of external factors. One particular factor is the growing sophistication of human activity under the impact of the new Information Technologies and the resulting need for continuous, lifelong professional development. Another factor is the internal urge within the system of
education for improvement to survive in the period of dramatic external changes. The system of education must be in the process of rapid transformation to adapt to these external factors and introduce new forms and methods of education. DE as a new form of education is a direct result of the interaction between external social and economic factors, and internal development of education itself.

As the economy becomes more customer-oriented, education needs to change accordingly. Baldock suggested an interesting theory identifying two major engines of change in the contemporary business world: "the pull that comes from increasingly demanding consumers, and the push that comes from the fear of suppliers that they will be left behind if they are not being innovative every moment of their corporate lives" (Baldock 1999, xxx).

This theory is easily projected on education: while students become more demanding, the number of schools of different types and levels is multiplying with every year to satisfy these growing and varied demands. The existing universities then, if they wish to survive in the increasing and tense competition, must be innovative and introduce new, more efficient and individualized forms, tools and methods of teaching and learning. They must also broaden the range of educational products and services they offer to students. So, the law of demand and supply is driving the educational change, and not only the economic one.

This drive for the development and diversification in the universities has two major mechanisms for its implementation: one is internal and the other is external. The first is for the university to find and employ the resources within its structure. However, there comes the point when it cannot expand any more. With the pull continuing, the universities have to turn to the other mechanism attracting the sources of educational products and services from the outside. The aim for universities is to combine these outside sources with their own and, thus, produce a different, more attractive mix of educational products and services. This leads to the formation of associations and consortia of universities that can jointly raise the standards of their products and services to a higher level and thus become more competitive.

Within these informal structures over time, however, some tensions emerge and develop. This originates from the desire of individual partners to preserve their independence and save on the overhead associated with unification. This happened in the CVU. These tensions are counterproductive and may lead to the eventual collapse of these collaborative configurations. Yet, while the stronger schools may choose to struggle for their survival independently, the weaker ones will cling together more closely for cooperation and mutual support under one umbrella. Then, individual differences and barriers between the members of the latter group will gradually vanish, thus leading to complete mergers and emergence of big, all-embracing structures.

This phenomenon of merge and consolidation is based on "the law of the transformation of quantity into quality: qualitative changes can only occur by the quantitative addition or subtraction of matter or motion" (Engels 1974). This is, probably, what we are going to
see in the next two or three decades on the national, as well as international, levels bringing about multinational educational corporations.

So, we would like to present the cycles in the current and future development of the new educational structures based on the Cycles Theory:

1st cycle (1969 - 1995):
1. Expansion/Single-School Model (The UKOU)
2. Integration Model
   2.1. Informal local Educational Information Network Model (CVU)
   2.2. Formal regional Integration (Funnel) Model (WGU)

2nd cycle (1996 - 20..)
1. Expansion/Single-School Model multiplied in separate universities and colleges
2. Integration Model
   2.1. Informal national/global integration
   2.2. Formal national/global system

The development of distance education has completed the first cycle with single and integrated local and regional structures. It has come onto the second cycle that, at first, saw the explosion of the distance educational capabilities of the existing schools since 1996. Then, the resources and services of individual schools will be gradually integrated—initially on an informal basis—into configurations like associations or consortia. Subsequently, they will integrate into a unified global system of up-to-date, lifelong higher education that will be abundant in affordable educational resources and services that can be offered to anybody in the world on a continuous basis. We believe that formal integrative models stand a better chance of representing new educational systems in the 21st century as we observe mergers and consolidation of businesses around the world, the centralization of higher education in some regions of the world—Anglo-Saxon countries (Berg, 1993)—and the general tendency of globalization (Davis, 1999). These are the characteristics of the current stage of economic and social development in the world that are, to a great extent, the result of the technological progress.

What is the Major Requirement for a Distance School?

We could challenge any model of a distance higher educational institution by only one criterion: *its self-sufficiency in its ability to meet all of the student's learning needs*. The institution should be able to satisfy any request by a current or potential student. Though no educational system can be fully self-sufficient in principle—due to the constantly developing world and ensuing change of the content and instructional strategies of education—it should always strive to achieve this goal. Education must go step-in-step with the developments in the society, business, industry and sciences. So, a school providing distance education has to contain and offer all possible materials, tools and support for the student. Basically, only the most comprehensive system will survive the competition and test of time.
New Models of Learning

Along with the appearance of new forms of education and new, technology-based schools, our perception of education, itself, underwent a dramatic transformation. The Socratic model of learning has long been the basic model of education:

Teacher - Student

This model is no longer a dyad. It has been transformed into a triad in which the computer, with all its periphery, extensions and links to the Internet, is an equal component:

Student

Teacher   Computer

This model is certainly more advantageous as it expands the opportunities for learning by allowing interaction between all three components of the model whether face-to-face or at a distance through the Internet: Student-Teacher, Student-Computer and Teacher-Computer. The teacher and the student can interact with each other directly and/or via the computer, which has become a communication tool in the Student-Teacher interaction.

Technology qualitatively changes the relationship between people and knowledge (Eisenstadt, 1995). It undoubtedly changes the relationship between people as well, both in education and in the society on the whole.

So, ET—in particular, telecommunications technology—is no longer considered just a means of delivery of educational materials and services: it is an integral part of the contemporary educational model as it has become a mediator of learning and teaching. Bork (1999) suggests a tutorial paradigm for learning that replaces the teacher in the traditional dyad by the highly interactive computer-based learning modules used through Distance Learning:

Computer - Student

This model reflects the changes in the contemporary education we have mentioned above, but totally eliminates live human presence of the teacher from the learning process—this causes certain concerns.
Before we deal with these concerns, let us analyze students' learning activities and identify those that allow application of ET tools (Table 1). This table is an attempt at classifying contemporary ET. Teachers and designers of educational software can use it as a guide in the development and application of tools and teaching/learning materials.

We arranged activities into five groups and assigned the existing tools to each of the activities so that we could see which activity can be performed with which tools. There are five groups of activities: information activities such as information search, processing and presentation; learning activities such as question-answer, drill and practice, problem solving, role play and simulation; research and project development; communication; and assessment.

The technologies were divided into two parts. The first part is computer technology, which offers computer-based courses, computerized tests, word processors, graphics software, spreadsheets, databases and presentation software. The second part is telecommunications technology, which offers distance courses, distributed educational resources, e-mail, videoconferencing, bulletin boards, whiteboards and chat.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Information</td>
<td></td>
<td>A. A1. Search</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1. Search</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2. Processing</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3. Presentation</td>
<td></td>
<td></td>
<td>+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1. Question/answer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2. Drill &amp; Practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3. Problem Solving</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4. Role Play</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5. Simulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Research &amp; Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Application of ET tools in Students' Learning Activities.

As we can see from the Table 1, practically all of the students' activities in education can be supported now by modern technologies. Yet, the majority of them—except computer-based courses, automated tests, databases and distributed resources—require participation in some form by the instructor. To achieve the advanced level of automation, all of the activities need to be supported by the computer, including course development and implementation.
There is still a problem facing automated learning: full, computer-based learning will not be feasible until the computer can understand free-constructed human speech. Then, there will be no need for various formalized evaluation tests (e.g., multiple choice) and learning programs without feedback. Artificial intelligence research, expert systems, speech recognition and linguistic analysis should be intensified. New models of knowledge representation—like the Latent Semantic Analysis Theory (Landauer, 1997)—may prove useful.

**Technology-Based but Human**

As the experience of the last decade of the 20th century demonstrates, there is an evident gain in productivity of teaching and learning, thanks to the use of computers. It transformed almost exclusively "manual" educational processes into highly automated ones. However, because education is a social institution and, as such, a part of society, we have to consider all possible implications of the contemporary, industrialized (Keegan, 1990), technology-based education on society and, most importantly, on human communication and relationships. Education of this kind and a distinct shift of learning into the "student-computer" paradigm pose major questions to which we have to find the answers. Namely, to what extent will education in the 21st century be automated, and how do we preserve the humanizing role of education in a technology-based environment?

We must do this because the tendencies that have been developing lately in society due to the growing impact of mass media, information technology and, particularly, mass culture that was quick to take advantage of the new opportunities, are very often worrisome. Pseudo-reality of video-computer games, or imaginary life of horror stories and movies where the creations of perverted minds of their creators take the form of a made-up reality, confuse young and unstable psyches. When teenagers fail to differentiate between fiction and reality, between the invented, fancied figures and acts, and true people and life, the result is misunderstanding and often denial of traditional human values like respect for human life, relationship, morals and for the society on the whole.

The question we have to find the answer to is this: what part of human involvement should be preserved in the technology-based education? Or, what should the ratio between the technology-based and human-involved education be? Education cannot be limited to the professional training only—it is a social institution and a process, the integral part of which is to develop citizens who will live and work in the society for its benefit, as well as for theirs. The ultimate goal of education, then, is not only to provide professional training but also to develop a student as a human being, as a person and, at the same time, as a member of human society. "Education and training are primary routes to responsible citizenship" (Daniel 1996, p. 5). So, education should not be fully automated. It should not be devoid of the human dimension that is so essential for raising young generations and the efficient functioning of the technology-based education, itself, that can certainly help us perform this "civilizing" function.
References


Acknowledgements
This paper became better both in content and language thanks to Professor Don Kauchak at the University of Utah.